

Sexual dimorphism in the Yellow-billed Shrike *Corvinella corvina* and in other African shrikes (subfamily Laniinae)

by L. G. Grimes

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During cooperative breeding studies of the Yellow-billed Shrike *Corvinella corvina* in Ghana, adults and nestlings were colour ringed and a small collection of skins made (9 ♂, 6 ♀, 5 juv). Contrary to statements in some handbooks on African birds sexual dimorphism is possible through a patch of colour restricted in fullgrown shrikes to the mid section of the flank feathers; its development was followed through observations of ringed juveniles.

In females the colour pattern, beginning at the base of a typical flank feather (4–5 cm long), is dark slate grey for approximately the first cm of its length, Maroon (No. 31 in Smithe 1975) for the next cm and white for the remaining 2–3 cm. There is usually some faint grey barring near the tip, which is white in old females and tinged Cinnamon-Rufous (No. 40) in young females. The rachis is dark brown almost black and contrasts with the white of the outer half of the feather. This gives the flank a streaked appearance similar to the underparts of an adult shrike. In males the first cm of a flank feather is dark slate grey as in females, the next cm is between Cinnamon and Cinnamon-Rufous (Nos. 39 and 40). In older full grown males the terminal half of a flank feather is dark grey (in no way white) with some faint rufous barring near the tip. In relatively young males (at least 2 yr 5 m old) the cinnamon and cinnamon-rufous colour extends the whole way to the tip of the feather and usually there are one or more faint grey bars near the tip.

The maroon and cinnamon-rufous colour patches of the mid section of the flank feathers provide an unambiguous means of distinguishing the sexes of *C. corvina* in the field. Unfortunately these may be concealed for long periods and escape notice, but they are exposed to good effect when the shrikes are in group territorial disputes, in displays at a nest or when individual birds are preening. They are not normally visible in museum skins and this probably accounts for the lack of reference to them in most African handbooks. Swainson (1837) first drew attention to these feathers but incorrectly credited the dark maroon colour (i.e., 'very deep and pure chestnut') to the male. Neumann (1910) described their colours correctly as does Bates (1930). Bannerman (1939, 1953), however, and Serle, Morel & Hartwig (1977) make no mention of sexual differences. Mackworth-Praed & Grant (1960) describe the male as having a pale chestnut patch and simply state that it is absent in the female. The same authors (1973) mention the maroon patch (they describe it as chestnut) on the flanks of the female and add that it is usually paler in the male. This is incorrect in my experience and their statement suggests that some skins they examined had been incorrectly sexed.

During moult from the juvenile plumage, both sexes have the tips of their flank feathers faintly coloured cinnamon-rufous. This was first noted by Alexander (1902), but subsequently overlooked. It may be picked out in the

field by about the 7th week of life and may persist as late as the 20th week. Around about the 11th or 12th week the sexual dimorphic colours on the flank feathers are sufficiently developed to allow separation of the sexes in the field. Early in the study when these plumage changes were not known, females showing this surface patch of cinnamon-rufous were incorrectly sexed as males.

An examination of skins of African shrikes (subfamily Laniinae) at the British Museum (Natural History), Tring revealed that sexual dimorphism similar to that of the female *C. corvina* occurs in several species, but not all. In the female Magpie Shrike *C. (Urolestes) melanoleucus* the flank patch is white whereas in the male the flank feather is uniform black similar to feathers of the underparts. Females of *Lanius excubitorius*, *L. cabanisi*, *L. dorsalis*, *L. mackinnoni* and most races of *L. collaris* (see later) have a concealed maroon patch on their flanks as in *C. corvina*. The males, however, do not have the cinnamon-rufous patch of the male *C. corvina* and their flank feathers are slate grey at the base merging to white at the tips, as are the rest of the feathers of the underparts. In contrast no sexual dimorphism occurs in the flank feathers of *L. excubitor* and *L. somalicus* and these are similar to those found in the male *Lanius* species already listed. Interestingly, juvenile *L. cabanisi* have the cinnamon-rufous wash on the surface of their flank feathers, but it was not detectable on the skins examined of juvenile *L. excubitorius*. In addition, a young female *L. cabanisi* had the characteristic maroon colour concealed underneath this surface colour, as is found in *C. corvina*.

In the African red-backed shrikes, the female of *L. souzgae* has a tawny wash to the flanks which distinguishes it from the male, but this is not the same as the restricted patch of concealed colour on the flanks of the fiscal shrikes and *Corvinella* species. In the remaining *L. gubernator*, sexual dimorphism is evident on the upperparts, but the flank colours are similar in both sexes.

The phenomenon of a (concealed) maroon flank patch in females of 5 species of *Lanius* shrikes seems to be a peculiarity of sub-Saharan Africa. This had been previously realised by Jackson & Sclater (1938) and, as a result, in their treatment of the genus *Lanius* they used subgenera and accorded these 5 species together with *L. excubitor* and *L. somalicus* to a subgenus *Fiscus*. The Fiscal Shrike *L. collaris* is also unusual as 3 of its sub-species *L. c. newtoni* (found on Sao Thome), *L. c. capelli* (found in west Uganda, southern Zaire, Zambia, Malawi and most of Angola) and *L. c. Smithii* (Sierra Leone to central Camerouns and further eastwards) lack this female characteristic (White 1962, M. Macdonald and I. Galbraith *in litt*).

The relationships between *Lanius* species is uncertain. Hall & Moreau (1970) suggest that *L. excubitor* and *L. somalicus* belong to the species group which includes *L. collaris*, *L. dorsalis* and *L. mackinnoni* and they include the Asian species *L. sphenocercus*, which also lacks the maroon flank patch in the female. At the same time they place *L. excubitorius* and *L. cabanisi* in a separate group, and these shrikes, unlike the Fiscal group, are gregarious throughout the year as are the *Corvinella* species.

Mayr & Short (1970: 71) have also examined relationships within the genus *Lanius* and proposed a superspecies comprising *L. excubitor*, *L. ludovicianus* (found in southern North America and which may prove to be

conspecific with *excubitor*) and possibly *L. sphenocercus*. They suggest in addition that *L. dorsalis*, *L. somalicus*, *L. excubitorius* (*excubitoroides*), *L. schach* (southeast Asia and New Guinea), *L. tephronotus* (northwest Himalayas) and *L. minor* at least should be treated with them as a species group.

If Hall & Moreau, and Mayr & Short are correct in their suggestions, then in Africa these female maroon flank patches have developed independently in two groups of *Lanius* species not immediately closely related (C. M. N. White *in litt*), as well as in *C. corvina*.

Amadon (1966) has emphasised that sexual dimorphism in plumage, however slight, is to be assumed adaptive. Swainson (1837) assumed that the colour difference in the flanks of *C. corvina* would be shown to play an important part in their sexual behaviour. During the 5 years of the cooperative breeding study, copulation was observed on 5 occasions only, and on none of these occasions were the flank colours prominently displayed. They are prominent during territorial disputes, but in what way they are significant in these displays is not known, and more study is required. As there are no closely related shrikes sympatric with *C. corvina* and *C. melanoleuca*, it is difficult to identify the selection pressures that would maintain the plumage dimorphism in these species. Presumably the same selection pressures apply to the other gregarious shrikes, *L. excubitorius* and *L. cabanisi*, which are also allopatric species. The presence of the distinctive patch in the females of *L. mackinoni*, *L. dorsalis* and most races of *L. collaris* is again unusual. Current ideas on the development of sexual dimorphism (Thomson 1970) in sympatric species would lead one to expect the sex character to be present in the male rather than the female. A further complication is that the African shrikes show only limited sympatry and the most interesting species to highlight this is *L. collaris*. The absence of the maroon patch in the insular *L. c. newtoni* is not unexpected. Nor is it too surprising in *L. c. capelli*, which is only sympatric with *mackinoni* in two relatively small areas of its range (Hall & Moreau 1970). However, contrary to expectation, in South Africa *L. c. collaris*, the only *Lanius* present, has the maroon patch in the female.

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The Yellow-billed Shrike *Corvinella corvina*: an abnormal host of the Yellow-billed Cuckoo *Cuculus gularis*

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The recorded number of host species parasitised by the Yellow-billed Cuckoo *Cuculus gularis* are few. Friedmann (1967) lists 10 possible species, but Payne & Payne (1967) and Jensen & Jensen (1969) reduce this to 6 (*Dicrurus adsimilis*, *Turdoides jardineii*, *T. libonyanus*, *Pycnonotus barbatus*, *Lanius collaris*, *Passer diffusus*) for which there is, in their opinion, unambiguous data that nest parasitism occurs. To this list can now be added the Yellow-billed Shrike *Corvinella corvina*, albeit an apparently abnormal host.

During a 5-year study of the cooperative breeding behaviour of this shrike at Legon, Ghana (5° 38' N, 0° 11' W) only one case of nest parasitism was discovered in over 160 shrike nests that were found. The nest belonged to a group of 9 shrikes, and the intention was to use it to study the feeding rates of nestlings and the individual contributions made by the shrikes, 6 of which were colour ringed. The nest was not, therefore, visited after the clutch size was known (5 eggs completed on 25 April) until the expected hatching dates (12/13 May). During 10 hours of observations on 15 May from a hide placed 20 m away from the nest there was no unusual behaviour to suggest that anything was amiss. The mean feeding rate of 5.1 feeds/hr was not unexpected for a nest that possibly contained a brood of 3 or 4 shrikes a few days old, and all members of the group participated in feeding. The next observations from the hide were on 23 May and 30 minutes elapsed before I realised that a well feathered *C. gularis* nestling was the sole occupier of the nest. My field description of the nestling agreed with that of Tarboton (1975), and the identification is certain in my mind. The cuckoos *Clamator levaillantii* and *Chrysococcyx caprins* also breed at Legon, but their nestlings cannot be confused with that of *C. gularis* (Jensen & Jensen 1969). Further periods were spent observing the cuckoo on 25 and 26 May. By this time the bird filled the nest, uttered calls quite unlike a shrike's of the same age, and crouched in the